Reduplication facilitates early word segmentation

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INTRODUCTION

Background

- Infants' word segmentation is facilitated by distributional cues and knowledge of familiar words (e.g., own names, *mommy*).
- Is early word segmentation also facilitated by the phonological shape of words, such as **reduplication (sound repetition)**?

Why reduplication?

- Neonates show greater brain activation in response to immediate repetition (e.g., *mubaba* cf. *bamuba, mubage*) (Gervain, Macagno, Cogoi, Peña, & Mehler, 2008; Gervain, Berent, & Werker, 2012).
- Repetition facilitates pattern generalization in infants and adults (Endress, Dahaene-Lambertz, & Mehler, 2007; Gomez & Gerken, 1999; Gomez, Gerken, & Schvaneveldt, 2000; Marcus, Vijayan, Rao, & Vishton, 1999).
- Early-acquired words often contain repetition of whole syllables or consonants, as in *daddy*, *baa-baa* and *yumyum* (Endress, Nespor, & Mehler, 2009; Gervain & Werker, 2008).

Research question

- Are young infants better at segmenting novel words in running speech that are reduplicated than novel words that are not reduplicated?

METHOD

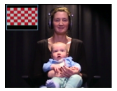
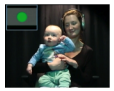
Participants

- 24 9-month-olds (13 ♀, M = 8m 28d, Range: 8m 12d - 9m 12d)

Materials

- 12 novel words: disyllabic CVCV structures in English
- Controlled for phonotactic and neighbourhood properties

Set	Reduplicated	Nonreduplicated
A	*neenee* /nini/ *foofoo* /fufu/	*neefoo* /nifu/ *foonee* /funi/
B	*bobo* /bobo/ *laylay* /lele/	*bolay* /bole/ *laybo* /lebo/
C	*yahyah* /jaja/ *dawdaw* /dɔdɔ/	*yahdaw* /jadɔ/ *dawyah* /dɔja/

Familiarization 	**Test** Central fixation 
6 trials: • 3 x passage* with reduplicated word (e.g., 6 x *neenee*) • 3 x passage with nonreduplicated (e.g., 6 x *bolay*)	12 trials: • 3 blocks with 4 conditions (+/- reduplicated x +/- familiarized)
The *neenee* was bright and shiny. A clown drank from the red *neenee*. The other one picked up the big *neenee*. His *neenee* was filled with milk. Meg put her *neenee* back on the table. Some milk from your *neenee* spilled on the rug.	*neenee, neenee, neenee* … (15x)
	foofoo, foofoo, foofoo … (15x)
The *bolay* ran around the yard. The postman called to the big *bolay*. He patted his *bolay* on the head. The happy red *bolay* was very friendly. Her *bolay* barked only at squirrels. The neighbourhood kids played with your *bolay*.	*bolay, bolay, bolay* … (15x)
	yahdaw, yahdaw, yahdaw … (15x)

* Passages adapted from Jucszyk and Aslin (1995).

RESULTS

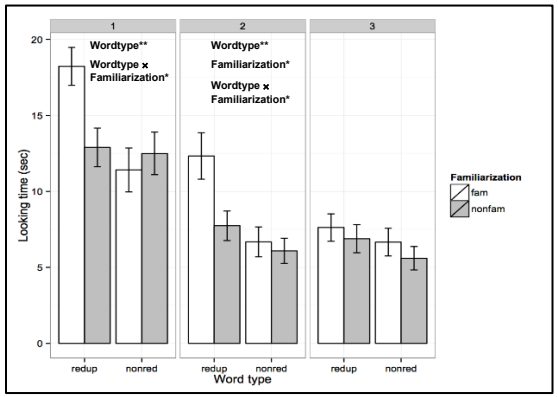


Figure 1: *Mean looking times by **word type, familiarization** and **block.***

Reduplication bias from input?

Not likely: Immediate repetition of syllables in infant-directed speech is typically not higher than chance level.

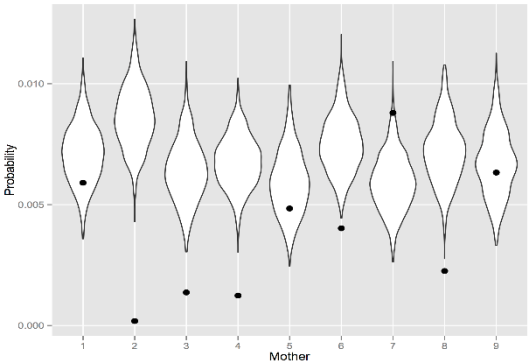


Figure 2: ***Observed** (black dots) vs. **simulated** (violin plots) **frequency** of immediate syllable repetition in the infant-directed speech of 9 mothers in the Brent-Ratner corpus. Simulated = random combinations of two syllables using the Monte Carlo method.*

DISCUSSION and CONCLUSIONS

- Infants are more likely to segment reduplicated rather than nonreduplicated words in running speech. They preferentially attend to repeated patterns in the context of word learning.
- It is likely that this is an inherent cognitive bias rather than an experience-based bias from the input.
- This bias may be the source of the prevalence of reduplication in baby-talk words.
- Interestingly, this bias runs against the tendency to avoid adjacent sound repetition in adult language and processing (e.g., Boll-Avetisyan & Kager, 2014). A conflict between constraints on learning and constraints on linguistic systems?